CLAIMS

What is claimed is:

1. A method of fabricating a contact comprising:

forming a Co or Ni silicide positioned on a substrate;

forming a nitrogen passivation layer on said Co or Ni silicide;

depositing a Group IVA metal layer atop said nitrogen passivation layer; and

annealing said Group IVA metal layer, said nitrogen passivation layer, and said Co or Ni silicide, wherein said nitrogen passivation layer substantially restricts diffusion between said metal layer and said Co or Ni silicide.

2. The method of Claim 1 wherein said forming said nitrogen passivation layer comprises annealing said Co or Ni silicide in a nitrogen-containing ambient.

3. The method of Claim 2 wherein said annealing of said Co or Ni silicide in said nitrogen-containing ambient at a temperature of about 450°C to 650°C and for about 15 to 90 minutes, and said nitrogen-containing ambient is NH_4.

4. The method of Claim 1 wherein said Group IVA metal layer comprises titanium, hafnium or zirconium.

5. The method of Claim 1 wherein said annealing said Group IVA metal layer comprises forming an upper metal nitride diffusion barrier and a lower amorphous metal silicide layer from said metal layer.

6. The method of Claim 5 wherein said lower amorphous metal silicide layer has a thickness of less than about 3.0 nm.

7. The method of Claim 1 wherein said forming a nitrogen passivation layer comprises atomic layer deposition, plasma chemical vapor deposition or plasma physical deposition.

8. A method for forming an interconnect comprising:

providing an initial structure having vias to expose a Co or Ni silicide region positioned on a substrate;

forming a nitrogen passivation layer atop said Co or Ni silicide region;

depositing a Group IVA metal layer atop said nitrogen passivation layer;

annealing said Group IVA metal layer in a nitrogen-containing ambient to form a metal nitride diffusion barrier and an amorphous metal silicide, wherein said nitrogen passivation layer substantially restricts diffusion between said metal layer and said amorphous metal silicide; and

depositing an interconnect metal within said vias and atop said metal nitride diffusion barrier.

9. The method of Claim 8 wherein said annealing said metal layer in nitrogen-containing ambient further comprises forming an amorphous metal silicide having a thickness of about 3.0 nm or less between said metal nitride diffusion barrier and said Co or Ni silicide region.

10. The method of Claim 8 wherein said interconnect metal is selected from the group consisting of W, Ir, Re, Ru, Pt, Al, and Cu.

11. The method of Claim 10 wherein said interconnect metal is tungsten formed from tungsten hexaflouride precursor gas, wherein said metal nitride diffusion barrier protects said Co or Ni silicide and said amorphous metal silicide.

12. The method of Claim 8 wherein said nitrogen passivation layer is formed by annealing said initial structure having vias to expose said Co or Ni silicide region at a temperature of about 450°C to about 650°C and for about 15 to 90 minutes in a nitrogen-containing ambient.

13. The method of Claim 12 wherein said nitrogen-containing ambient is NH_4.

14. The method of Claim 8 wherein said nitrogen passivation layer has a thickness of less than approximately 30.0 Å.

15. The method of Claim 8 wherein annealing said Group IVA metal layer dissipates said nitrogen passivation layer.

16. The method of Claim 8 wherein said metal nitride diffusion barrier comprises titanium nitride, hafnium nitride, or zirconium nitride.

17. A via interconnect silicide junction comprising:

a substrate having a Co or Ni silicide region;

an amorphous metal silicide region atop said silicide region having a thickness of less than about 3.0 nm;

a metal nitride diffusion barrier atop said amorphous metal silicide region; and

an interconnect in electrical contact with said Co or Ni silicide.

18. The via interconnect of Claim 17 wherein said metal nitride diffusion barrier comprises titanium nitride, hafnium nitride, zirconium nitride, titanium oxynitride, hafnium oxynitride, or zirconium oxynitride.

19. The via interconnect of Claim 17 where said amorphous metal silicide region comprises titanium cobalt silicide, titanium nickel silicide, hafnium cobalt silicide, hafnium nickel silicide, zirconium cobalt silicide, or zirconium nickel silicide.

20. The via interconnect of Claim 17 where said amorphous metal silicide region comprises titanium cobalt oxide silicide, titanium nickel oxide silicide, hafnium cobalt oxide silicide, hafnium nickel oxide silicide, zirconium cobalt oxide silicide, or zirconium nickel oxide silicide.